



# RAILWAY SECTOR ASSESSMENT FOR AZERBAIJAN

MARCH 2021



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Note:

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Cover design by Edith Creus.

Cover photos (left to right): Azerbaijan Railway passenger train, container port in Azerbaijan, and container block train operating in Azerbaijan (photos by Azerbaijan Railways).

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# ABBREVIATIONS

|         |   |
|---------|---|
| ADB     | Asian Development Bank                      |
| ADY     | Azerbaijan Railways                         |
| ASCO    | Azerbaijan Caspian Shipping Company         |
| BTK     | Baku–Tbilisi–Kars                           |
| CAREC   | Central Asia Regional Economic Cooperation  |
| CIS     | Commonwealth of Independent States          |
| CMO     | corridor management organization            |
| CTC     | Caucasus Transit Corridor                   |
| EMU     | electric multiple units                     |
| FSU     | former Soviet Union                         |
| km      | kilometer                                   |
| KPI     | key performance indicator                   |
| MC      | Member Country                              |
| PRC     | People’s Republic of China                  |
| ro-ro   | roll-on roll-off                            |
| SLA     | service level agreement                     |
| SPA     | service provision agreement                 |
| TA      | technical assistance                        |
| TEN-T   | Trans-European Transport Network            |
| TEU     | twenty-foot equivalent                      |
| TITR    | Trans-Caspian International Transport Route |
| TRACECA | Transport Corridor Europe Caucasus Asia     |
| UIC     | International Union of Railways             |

# CURRENCY EQUIVALENTS

(as of 3 June 2020)

|               |   |                          |
|---------------|---|--------------------------|
| Currency unit | – | Azerbaijan manat/s (AZN) |
| AZN1.00       | = | \$0.5882                 |
| \$1.00        | = | AZN1.70                  |



# INTRODUCTION AND BACKGROUND

## A. Introduction

1. In 2017, the eleven Member Countries (MCs) of the Central Asia Regional Economic Cooperation (CAREC) program approved the CAREC Railway Strategy with a view to expanding the role of railway transport in the region.<sup>1</sup> The strategy aims to accelerate the identification, preparation and financing of feasible railway investment projects and, at the same time, advance the commercialization and reform of railways to improve their performance (ADB 2017a).

2. In 2018, the Asian Development Bank (ADB) approved a \$2 million regional technical assistance (TA) project for CAREC Railway Sector Development to assist MCs in implementation of the CAREC Railway Strategy (ADB 2018).<sup>2</sup> The TA is intended to accelerate the sound development of the railway sector in CAREC countries by providing support for railway transport market research, project identification and preparation, knowledge sharing and preparation of practical actions for commercialization and reform in MCs.

3. During the first part of TA implementation, the TA consultants conducted assessments of the railway sector in each MC. The purpose of these assessments was to examine the setting, characteristics, performance and prospects of railways, and identify promising investment

opportunities, and commercialization and reform actions, that could be considered for support through the TA. This short report summarizes the findings of the railway sector assessment for Azerbaijan, based on country visits in 2018 and 2019.

## B. Railway network and port facilities

### 1. Railway network

4. Azerbaijan is a medium-sized country with a population of 9.9 million in 2018 and a per capita gross national income of \$4,080 in 2017 (ADB 2019). It is located at the crossroads of Asia and Europe, bounded to the west by Armenia and Georgia, to the north by the Russian Federation, to the south by Iran, and to the east by the Caspian Sea. Much of its terrain is mountainous.

5. The Azerbaijan railway network was originally developed as part of the Russian Empire's Transcaucasus Railway, now known as the Caucasus Transit Corridor (CTC). Its main purpose was to transport oil from Baku on the Caspian Sea to Poti on the Black Sea for onward shipment to Russia's Black Sea port of Novorossiik. The main line between Baku, Tbilisi, and Poti (both Georgia) via Yevlakh, Ganja, and Tovuz was developed between 1865 and 1883.

<sup>1</sup> The eleven CAREC member countries are Afghanistan, Azerbaijan, the People's Republic of China (specifically the Xinjiang Uygur Autonomous Region and the Inner Mongolia Autonomous Region), Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.

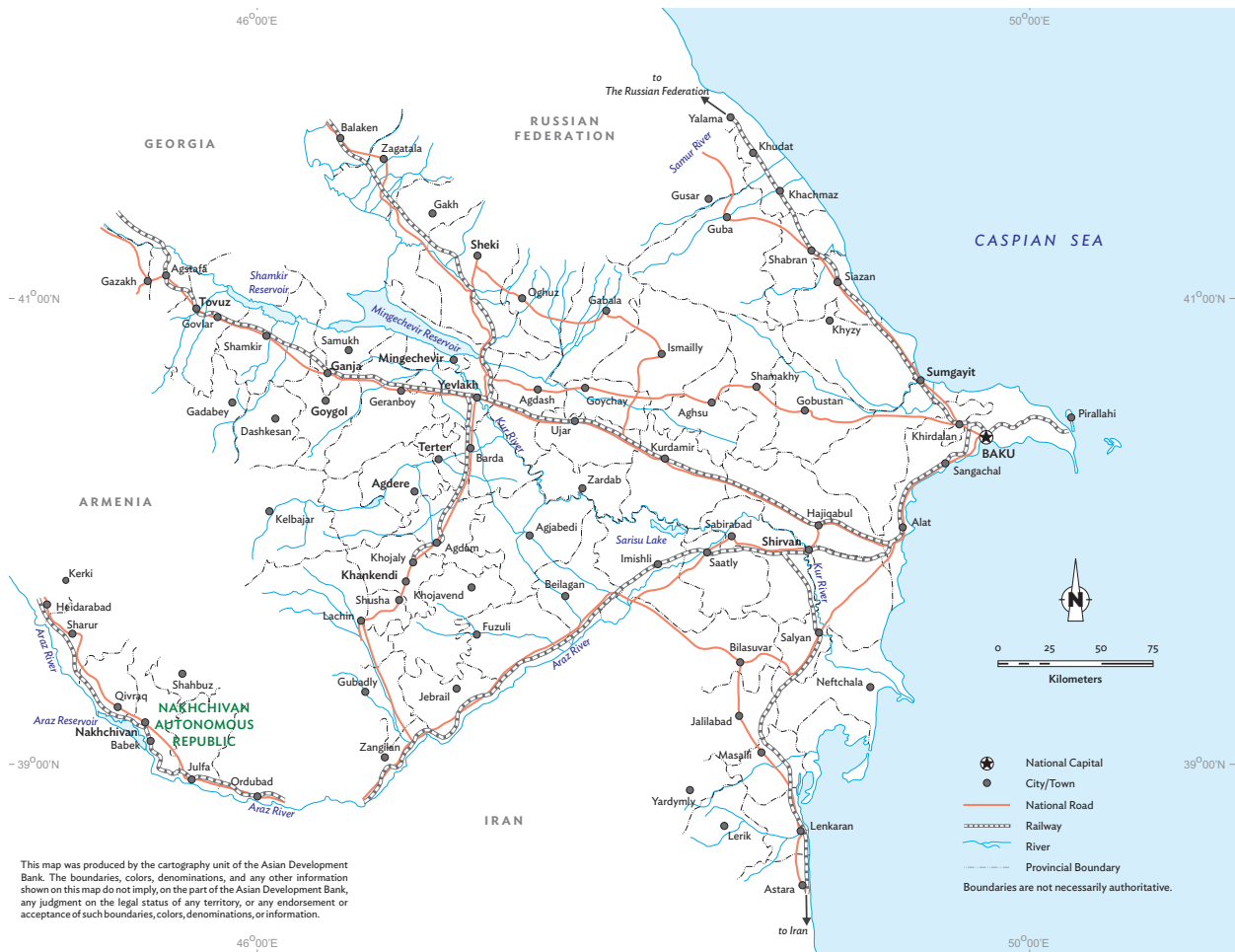
<sup>2</sup> The TA is cofinanced by the People's Republic of China (PRC) Poverty Reduction and Regional Cooperation Fund and the United Kingdom Fund for Asia Regional Trade and Connectivity (under the Regional Cooperation and Integration Financing Partnership Facility).

Apart from the CTC, Azerbaijan has two other main lines. One extends north from Baku via Yalama to the Russian border; the other extends south from Baku via Osmanli Junction to the border with Iran near Astara.

6. Azerbaijan regained its independence when the Soviet Union collapsed in 1991. Subsequently, Azerbaijan Railways (ADY) was established to independently manage and maintain the country's railways.

7. The Azerbaijan railway network is broad gauge (1,520 mm) and electrified with 3 kV DC. The total network length is 4,285 kilometers (km), of which 60% is electrified and 38% is doubletracked including the CTC and the northern line to the Russian Federation via Yalama.<sup>3</sup> Current network utilization amounts to 6.02 million train-km per year (2019), with 4.21 million train-km (70%) of utilization attributable to freight trains and 1.81 million train-km (30%) to passenger trains. The railway network is shown in Figure 1.1.

**Figure 1.1: Azerbaijan Railway Network**



Source: ADB.

<sup>3</sup> The railway network includes 240.1 km within territories occupied by Armenia and 71.7 km within the territory of the Nakhchivan Autonomous Republic.

8. With the support of an ADB sector development program approved in 2017, ADY is currently rehabilitating 166 km of the double-tracked north–south corridor between Sumgayit and Yalama. This is expected to increase the average speed of freight trains from 20 km to 60 km per hour (ADB 2017b). Mainline electrification is being changed to 25 kV AC.

9. The new Baku–Tbilisi–Kars (BTK) railway line linking Azerbaijan, Georgia, and Turkey began operations in 2017. The BTK transshipment terminal at Akhalkalaki in Georgia is operational for containers to change platform wagons between broad gauge (1,520 mm) and standard gauge (1,435 mm) used in Turkey. The BTK railway is the shortest rail link between Europe and Asia, and connects to international markets via the Mediterranean Sea port of Mersin.<sup>4</sup> Since late 2019, when Istanbul’s Marmaray Tunnel (13.5 km) was made available for freight trains, it became possible for traffic between Europe and the CTC to pass through Turkey using the same train without having to transfer to Bosphorous ferries.<sup>5</sup>

10. In the past decade, Azerbaijan and Iran completed construction of railway sections near the border but Iran has yet to build the 162.5 km missing link between Rasht and Astara, as well as associated gauge change facilities. To develop the quality of the services offered by the railways system in a manner that enables it to effectively and efficiently handle the domestic and regional traffic demand and to attract additional transit traffic, Azerbaijan plans to rehabilitate and modernize the southern part of the North–South Corridor in Azerbaijan.

This is mainly a single line and in poor condition. Preparatory works were started using state budget funding. The government has submitted a request to the World Bank to finance the main rehabilitation and modernization work, and is also discussing the possibility of ADB providing co-financing or parallel financing.

11. Currently, ADY’s rolling stock fleet includes 59 mainline locomotives (electric), 36 diesel mainline locomotives (10 new), 80 diesel shunting locomotives, 4,193 freight wagons (3,101 new), and 9 modern electric multiple units (EMUs). It also had 121 passenger wagons at the end of 2019.

12. ADY has been modernizing its rolling stock fleet, much of which was inherited from the former Soviet Union (FSU). In 2014, it contracted Alstom to provide 40 new freight locomotives (25 kV AC) and 10 new passenger electric locomotives (multi system, AC/DC). It also contracted Stadler Rail to provide 20 new passenger coaches for international traffic to Georgia, with gauge changing bogeys for use on the BTK line.<sup>6</sup> Additionally, ADY and Baltic Loco Group contracted for the repair of 37 different purpose locomotives, 3 passenger trains, 1 special purpose train, and 30 passenger wagons. For regional passenger services, ADY has acquired 9 new double-deck Stadler EMUs and plans to increase its fleet to 19 units in the next 3 to 4 years. Five Co’Co’ freight locomotives have been refurbished and remotorized.<sup>7</sup> In 2015, to supplement its capacity for freight haulage, ADY entered into a lease contract for more than 10 GE Type TE33A diesel locomotives produced in Kazakhstan. In 2015 and 2016, it also entered into service 3,101 new freight wagons of various types.

<sup>4</sup> Up to November 2019, the BTK railway had carried 275,000 tons of freight. Passenger services are expected to start soon.

<sup>5</sup> The first PRC–Turkey–Europe train, organized by ADY Container, carried 42 containers from the PRC to the Czech Republic (International Railway Journal 2019).

<sup>6</sup> ADY has an option to purchase 70 additional coaches.

<sup>7</sup> A Co’Co’ diesel locomotive has two six-wheeled bogies with all axles powered and a separate traction motor per axle.

## 2. Ports and shipping

13. Historically, Baku has been the largest port on the Caspian Sea, with a capacity of 15 million tons of bulk and 10 million tons of dry cargo. More than 80% of freight is in transit. In 2007, with a view to improving port capacity and reducing congestion in the city of Baku, the government decided to move all freight activities from Baku city to a new port at Alat, about 80 km south of Baku. This was opened for traffic in 2018, with an annual capacity of 15 million tons and 100,000 twenty-foot equivalents (TEUs) in the first phase of development.<sup>8</sup> All containers, including feeder services to and from Aktau (Kazakhstan), are now handled in the Baku port at Alat. The new port is connected to the railway network and has its own rail terminal within the port. Work processes are being automated through introduction of a management information system, a terminal operational system and a port community system. The port of Baku is also collaborating with the Organization for Security and Co-operation in Europe to conduct feasibility studies on creating a universal web portal to jointly serve the Caspian Sea ports of Baku, Aktau, Kuryk (both Kazakhstan), and Turkmenbashi (Turkmenistan).

14. In the past, Turkmenbashi was the main connecting point for shipping to and from Baku.<sup>9</sup> Following recent upgrading, Turkmenbashi now has a capacity of 400,000 TEU, 17 million tons of cargo, 3 million tons of bulk cargo, 4 million tons of general cargo, 75,000 trucks, and 300,000 passengers (Turkmenbashi International Seaport 2018). There is no fixed schedule for cargo vessels. About four vessels arrive and depart each day, mainly vessels under Turkmen or Azerbaijan flags.

15. The other major Caspian Sea port connecting with Baku is the Kazakh port of Aktau which has an annual throughput capacity of 17.7 million tons. A rail ferry service with capacity for 54 wagons operates to and from Baku (Azerbaijan). A roll-on, roll-off (ro-ro) ferry service is also available with capacity for 35 trucks. Both the rail ferry and the ro-ro ships take around 18–20 hours for the crossing. The nearby port of Kuryk was opened in late 2016. In addition to offering ro-ro services, it can handle grain, fertilizers, oil and other chemical products. About 25% of ferries from Baku now serve Kuryk.

16. The existing rail ferry and ro-ro services do not have a fixed schedule. The frequency of services to and from Aktau and Kuryk varies depending on weather conditions and demand. Vessels generally wait until fully loaded before departing, which is approximately every 3–5 days for Aktau–Baku and Kuryk–Baku.

17. Caspian Sea shipping services have been closely linked to the development of Caspian Sea oil and gas production and the shipment of oil to the Russian Federation. Many of the vessels are relatively small as they need to operate on both the Caspian Sea and the adjoining Volga river and Volgodon canal. Shipping services for transporting railway wagons and containers are less developed.

18. Aside from the Russian Federation, the largest shipping operator is the Azerbaijan Caspian Shipping Company (ASCO).<sup>10</sup> Its fleet includes 20 tankers, 13 ferries, 15 universal dry-cargo ships (12 on the Black Sea), and 2 ro-ro ships. Until now, there has been limited demand for container transportation on the Trans-Caspian route so ASCO has continued to use railway ferries that carry up to 54 railway wagons

<sup>8</sup> Two further phases of development are planned for the Baku port at Alat, including expansion of port capacity and extension development of an adjoining free economic zone.

<sup>9</sup> The Central Asian Railway—from present-day Turkmenbashi (formerly known as Krasnovodsk) to Kokand (Uzbekistan) via Ashgabat, Mary (both Turkmenistan), Bukhara and Samarkand (both Uzbekistan)—was the first railway built by the Russian Empire in Central Asia. It was completed in 1888. Spurs to Tashkent and Andijan (both Uzbekistan), and toward the Afghanistan border at Serhetabat via Mary (both Turkmenistan), were added in 1898. A train ferry from Turkmenbashi to Baku was introduced in 1905.

<sup>10</sup> In 2014, 39% of Caspian Sea vessels were from the Russian Federation, with 35% from Azerbaijan, 14% from Iran, 6% from Kazakhstan, and 6% from Turkmenistan (Schoen and Gueriot 2015).

(240 TEU) per day. It is the only operator of such Caspian railway ferries. These depart daily from the port of Alat to Kazakhstan and Turkmenistan. Kazakhstan's National Maritime Shipping Company, Kazmortransflot, operates Caspian Sea liquid bulk shipping services; while KTZ Express, a subsidiary of KTZ, operates solid bulk, general cargo and container services and logistics. KTZ Express recently introduced a container feeder ship, the Turkestan, to provide services between Aktau and Baku. Use of container feeder ships is more efficient as it enables railway wagons to be released once containers have been transferred to ship—instead of having to be shipped along with the cargo.

## C. Institutional responsibilities for railways

19. ADY is a state-owned joint stock company responsible for the management and maintenance of railway infrastructure and the operation of railway passenger and freight services. It reports directly to the Cabinet of Ministers. There are three main departments: (i) freight transportation department, (ii) passenger transportation department, and (iii) infrastructure department. ADY employs a total of 19,000 staff.

20. ADY is expected to become economically viable without requiring subventions from the state budget. Since this has not yet been achieved, ADY has been implementing measures to strengthen efficiency and commercial orientation. It introduced a marketing department with a view to attracting additional traffic and improving commercial performance. It implemented “ADY Smart,” a freight monitoring software, which is being used to monitor wagon utilization and will also monitor freight locomotive utilization in future. It also purchased a timetabling program that also simulates infrastructure

restrictions, improvements and timetable adjustments for passenger and freight services.

21. With ADB support, ADY is implementing a reform program supported by TA (ADB 2017). This includes railway organizational reform and implementation of several strategic and performance-based improvement measures, notably the development of a contractual mechanism, in the form of a public service obligation (PSO) and a service provision agreement (SPA). A PSO mechanism would compensate ADY for loss-making passenger services that the government requires it to operate. The SPA would help ensure ADY has a predictable source of financing for maintenance of railway infrastructure during 2020–2030, reduce the need for freight to cross-subsidize passenger services, and enable ADY to offer more competitive freight tariffs. The PSO and SPA proposals are under discussion with the respective governmental bodies.

## D. Transit routes and bottlenecks

### 1. Transit routes

22. As shown in Figure 1.2, Azerbaijan is located at the intersection of important international freight corridors. The CTC, extending east–west between the Black Sea and Caspian Sea, and crossing the Caspian Sea between Baku/Alat and either Aktau (Kazakhstan) or Turkmenbashi (Turkmenistan), is an important supply route for Central Asian countries. The North–South corridor provides a direct link between Azerbaijan and the Russian Federation without having to cross the Caucasus. It was also designed to extend further south into Iran, connecting the Russian Federation with the Indian Ocean. In 2019, around 162.5 km of track is still missing between Astara and Rasht in Iran's Gilan Province. This is scheduled to open in 2021 but there is currently no progress due to economic sanctions imposed on Iran.

**Figure 1.2: Regional Rail Links and Ports Serving Cross-border and Transit Traffic**



Notes: (1) Within the PRC, the map covers principal railway trunk routes used for trade between the PRC and CAREC member countries and regional railway links relevant for Inner Mongolia and Xinjiang, the two PRC regions that participate in CAREC; (2) the boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

Source: TA consultants.

23. The market for transit traffic is subject to competition among modes and corridors. Market segments relevant for Azerbaijan are summarized below:

- (i) **Between the PRC and Northern Europe.**  
This is the largest segment of Eurasian freight. It mainly uses ocean shipping. The part that is transported by land includes goods from/to PRC centers located far from ports and time-sensitive goods

requiring faster delivery. This is mainly transported by rail on the Trans-Siberian Railway that links Asia and Europe via the Russian Federation. While this is the longest distance Eurasian corridor, it has the advantage that border crossing delays are minimized since most of the journey is within the Russian Federation, and connections through Kazakhstan and Belarus remain within the common customs area of the Eurasian Economic Union (EEU).<sup>11</sup>

<sup>11</sup> The members of the EEU are Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and the Russian Federation.

- Some traffic also uses the multimodal Trans-Caspian International Transport Route (TITR).<sup>12</sup> West of Baku the TITR follows the CTC.<sup>13</sup>
- (ii) **Between Central Asia and Northern Europe.** This is comparable with item (i) above, but faces additional competition from the routes connecting to the Trans-Siberian Railway.
- (iii) **Between the PRC and Southern Europe.** Large parts of the cargo volumes are transported by shipping but land transport is competitive for some commodities. The TITR between the PRC and Europe via Central Asia is one of the shortest distance routes. For some traffic between the PRC and southern Turkey and the eastern Mediterranean, the newly completed BTK Railway provides an alternative within the Caucasus that avoids crossing the Black Sea. For BTK Railway traffic, a change from broad gauge to standard gauge takes place at Akhalkalaki in Georgia. To realize the full potential of the TITR, various existing bottlenecks need to be overcome, including (a) additional costs, delays and uncertainties due to having to traverse multiple Central Asian countries, (b) transport bottlenecks including gauge changes, rolling stock shortages and limitations in Caspian and Black Sea shipping services, and (c) limitations in coordination and harmonization of services and tariffs among railway administrations along the corridor.
- (iv) **Between Central Asia and Southern Europe.** The TITR is one of the shortest distance corridors for this market segment. The advantages and bottlenecks are similar to item (iii) above. The TITR is more likely to be used by traffic originating or terminating in nearby parts of Central Asia, for example in Kazakhstan, the Kyrgyz Republic, and northeast Uzbekistan. For origins and destinations further to the south, the Lapis-Lazuli Corridor, which extends from western Afghanistan to Turkmenbashi port (Turkmenistan) and then to Baku—could potentially offer a shorter distance alternative, as could the route through Uzbekistan via Bukhara to Beyneu and Aktau (Kazakhstan). Like the TITR, both routes use the CTC between the Caspian and Black Seas. However, both routes are currently underdeveloped in terms of service coordination and marketing. Railway routes between Central Asia and Southern Europe also face strong competition from road transport, especially for shorter distance journeys.
- (v) **Between Iran and Europe and the Russian Federation.** When economic sanctions against Iran come to an end, this may lead to increased railway traffic between Iran and Europe via the Black Sea or the BTK Railway, although there will be increased competition from ocean shipping services between Iran's Persian Gulf ports and Europe.

<sup>12</sup> The TITR is sometimes referred to as the Middle Corridor. The members of the TITR Association comprise Azerbaijan Caspian Shipping, ADY, Aktau Port, Baku Port, GR, Kazakhstan Railways, Turkish Railways, and Ukraine Railways. Associate members include the Polish Broad Gauge Railway, Batumi Port, Kaskor-Transservice (Kazakhstan), Port Kuryk (Kazakhstan), Anaklia Development Consortium, Lianyungang Port Holdings Group (PRC), Grampet Group (Romania), Astyk Trans (Kazakhstan), Kazakhstan National Maritime Shipping Company, and Eastcomtrans (Kazakhstan).

<sup>13</sup> The TITR is a multimodal route with four main parts (i) railway between East Asia and the Caspian Sea, (ii) shipping across the Caspian Sea, (iii) railway through the CTC, and (iv) shipping across the Black Sea. Freight has to be transferred from rail onto roll-on-roll-off ferries or container vessels to cross the Caspian Sea and Black Sea. On the Caspian Sea, the route is between Baku and Aktau (Kazakhstan). On the Black Sea, the main routes are between the Georgian ports of Poti or Batumi and the ports of Odessa (Ukraine), Constanta (Romania), Varna (Bulgaria), and Istanbul (Turkey). The TITR is sometimes referred to as the Middle Corridor.

There could also be increased railway traffic between the Russian Federation and Iran's Persian Gulf, some of which may but used the North-South corridor on the eastern side of the Caspian Sea via Azerbaijan.<sup>14</sup> However, this will face competition from Caspian Sea shipping between the Russian Federation and Iranian ports, and from railway services on the North-South corridor on the western side of the Caspian Sea via Kazakhstan and Turkmenistan.

(vi) **Between the Caspian and Black Seas.**

For all segments requiring transport between the Caspian and Black Seas, the CTC also faces further competition from shipping services on the Volgodon Canal which extends from Astrakhan (Kazakhstan) on the Caspian Sea's northwest coast through the Russian Federation to the Asov Sea that flows into the Black Sea. Due to harsh winter conditions, the canal is closed from November to April.

## 2. Transit bottlenecks

24. Azerbaijan's coastal railway between Yalama, Baku and Astara is designed to carry 10 million tons of freight per year. Once ADY completes the planned modernization of the Sumgayit-Yalama section (para. 8) and Iran completes the missing link and gauge change facilities (para. 10), the line will be well equipped to serve traffic. ADY has been working closely with Iran to support construction of the missing link. It will be responsible for operating the gauge change systems, although they will be located on the Iranian side of the border.

25. The CTC faces several bottlenecks. First, the Black and Caspian Sea ports and shipping services have issues regarding service quality, reliability and high tariffs. This is partly being addressed through

planned upgrading of ports and replacement of old vessels. Second, while the railway between Georgia, Baku and Alat is double-tracked and electrified, the infrastructure quality has deteriorated and there are many slow speed sections. This will be addressed by planned upgrading, including additional electrification, signaling improvement and provision of a train protection system. Third, Azerbaijan's existing inland terminals along the CTC are outdated, inefficient and generally cannot receive whole trains, which contributes to high terminal charges. Most were designed to handle oil and oil products, and there are relatively few intermodal terminals. However, the port of Alat now has a modern container terminal with rail access and a trajectory loading facility for shipping services to Turkmenbashi. Also, in the Baku area a new intermodal facility has opened at Abcheron and a further facility will open in the near future at Sumgayit.

26. The government has been active in regional cooperation and integration initiatives to improve transit corridor performance beyond Azerbaijan territory. This has included (i) bilateral free trade agreements with members of the Commonwealth of Independent States; (ii) a partnership and trade agreement with the EU; (iii) joining broad-based regional initiatives to develop transit routes including the Transport Corridor Europe Caucasus Asia (TRACECA), the Trans European Transport Network (TEN-T),<sup>15</sup> and CAREC; (iv) participating in regional initiatives to develop new transit routes and corridors, including being a founder member of the TITR Association, and a member of the Persian Gulf-Black Sea Corridor (Azerbaijan, Armenia, Bulgaria, Georgia, Greece, and Iran) and the Lapis-Lazuli Route Agreement (Afghanistan, Azerbaijan, Georgia, Turkey, and Turkmenistan); and (v) participating in discussions about a proposed Persian Gulf-Black Sea Corridor (covering Iran, Azerbaijan, Armenia, Bulgaria, Georgia, and Greece).

<sup>14</sup> Assuming the missing link between Astara and Rasht is completed (para. 10).

<sup>15</sup> The EU's Indicative Investment Action Plan for the Eastern Partnership of TEN-T identifies upgrading of the Azerbaijan's east-west railway connecting Georgia with Baku and Alat as one of the priority projects (EU 2018).



## E. Relevant CAREC corridors

27. The CAREC corridors relevant for railway development in Azerbaijan are Corridors 1, 2, and 6.

28. **CAREC Corridor 1: Europe–East Asia—Subcorridors 101–103 (Figure 1.3).** These subcorridors encompass the parts of the TITR in the PRC and Kazakhstan, extending as far as Shalkar in western Kazakhstan. Subcorridor 102 covers the TITR's southerly route through Kazakhstan via Almaty and Shymkent. Subcorridors 101 and 103 together cover the TITR's northerly route through Kazakhstan via Aktogay, Mointy, and Zhezkazghan. A gauge change is required at the Kazakhstan–PRC border. Beyond Shalkar, Corridor 1 proceeds northwards toward the Russian Federation while the TITR continues westwards to Beyneu and Aktau Port (both Kazakhstan).

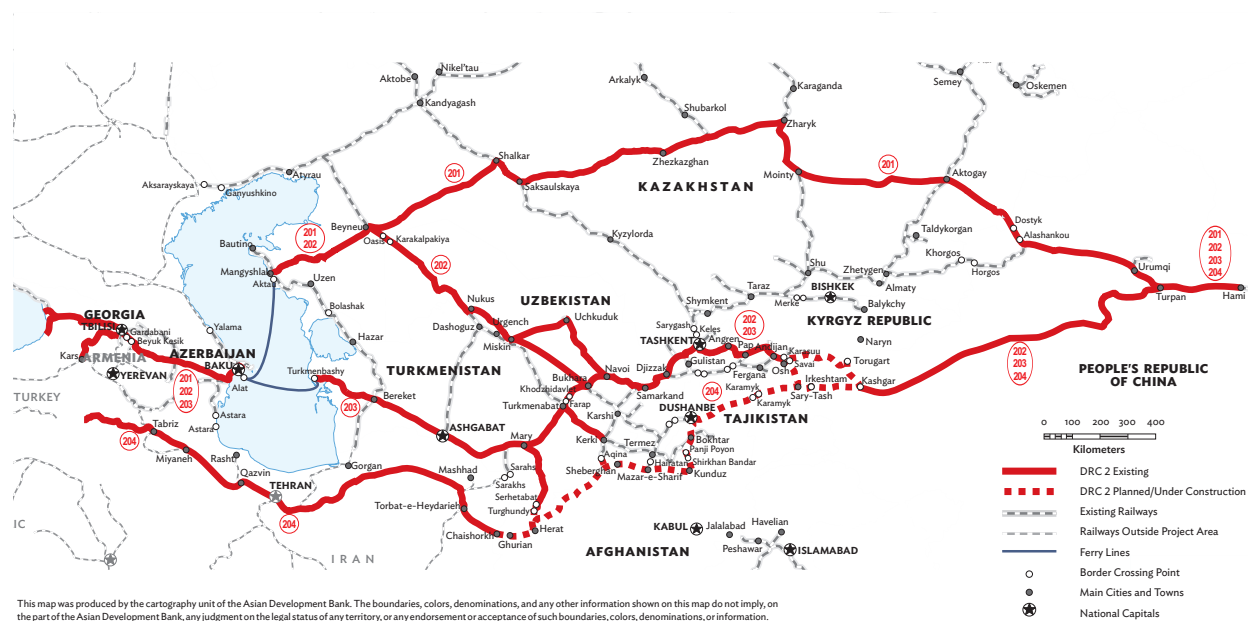
29. **CAREC Corridor 2: Mediterranean–East Asia—Subcorridors 201–203 (Figure 1.4).** Corridor 2 provides four routes between the PRC and the Mediterranean via the CTC. Subcorridor 201 via Aktogay, Mointy, and Zhezkazghan is the same as the northerly route through Kazakhstan using Subcorridors 101 and 103 (para. 28) but west of Shalkar it continues to follow the TITR via Beyneu, Aktau port, Baku, and Tbilisi. Subcorridor 202 is similar, except that between Turpan (PRC) and Beyneu, it follows a southerly alignment via Kashgar, Torugart (Kyrgyz Republic), Savai, Tashkent, Navoi, and Nukus (all Uzbekistan). The section between Kashgar and Savai is a missing link. Subcorridor 203 is similar to Subcorridor 202, except that between Navoi and Baku it connects with Turkmenistan's east–west corridor to Turkmenbashi port where it crosses the Caspian Sea to Baku.

**Figure 1.3: Sections of CAREC Corridor 1 Relevant for Azerbaijan**



Source: CAREC Secretariat.

**Figure 1.4: Sections of CAREC Corridor 2 Relevant for Azerbaijan**



This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

Source: CAREC Secretariat.

Subcorridor 204 follows a more southerly route west of Kashgar and passes through Tehran (Iran) avoiding the need for transfer to Caspian Sea shipping. However, none of the sections of Subcorridor 204 within the Kyrgyz Republic, Tajikistan, and Afghanistan have been built, and costs of construction would be very high due to mountainous terrain.

**30.** Subcorridor 201 is the simplest and most predictable route. All overland transport can use rail. Between the Caspian Sea and East Asia only two countries are crossed—Kazakhstan and the PRC.

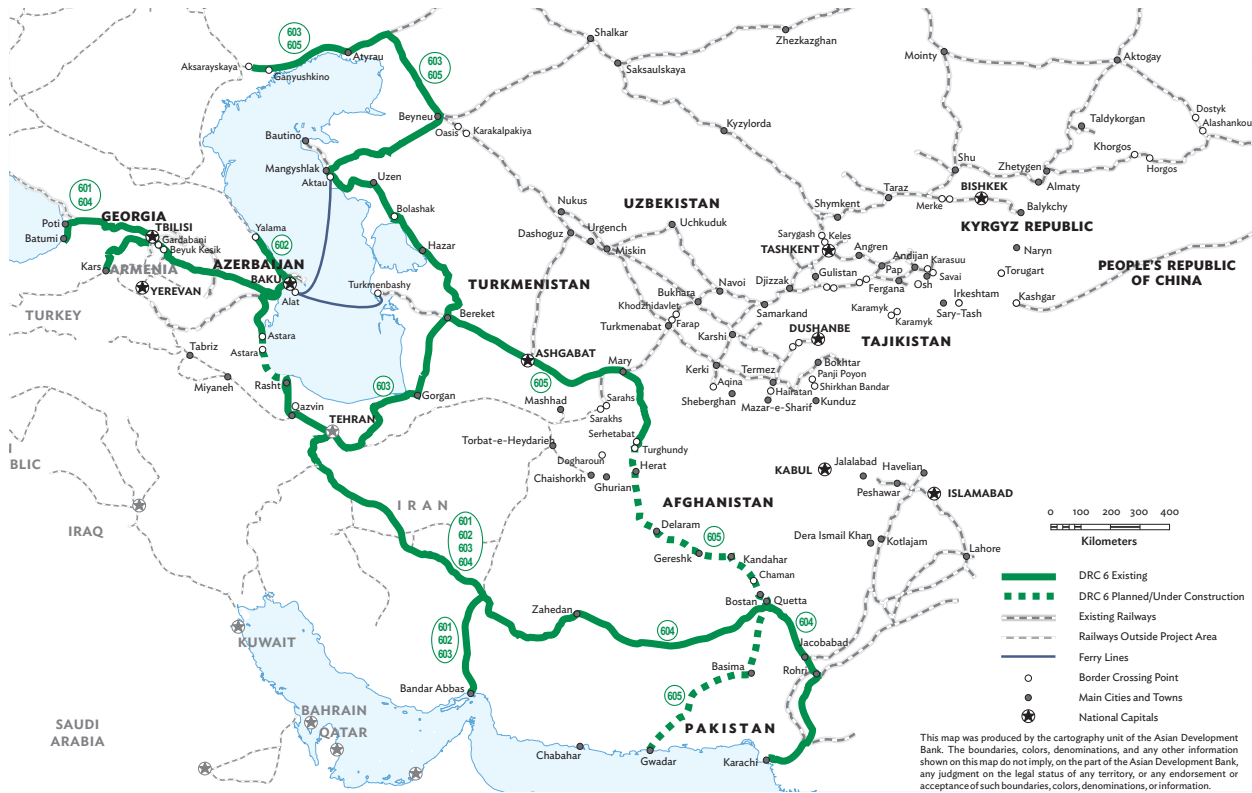
**31.** Subcorridors 202–204 offer advantages for traffic to and from the central and southern parts of Central Asia—including Uzbekistan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and northern Afghanistan—but are currently limited by missing links. Traffic to and from Central Asian countries located near the Caspian Sea is less affected by the missing links and has few borders to cross—

for example Turkmenistan (no crossings) and Uzbekistan (one crossing). Longer distance traffic, in particular to the PRC, requires costly transfers to road transport and multiple border crossings.

### **32. CAREC Corridor 6: Europe–Middle East and South Asia—Subcorridors 601–604 (Figure 1.5).**

Over the medium to longer term, Corridor 6 could potentially provide a source of future traffic between Europe and the Middle East and both Iran and Pakistan. Subcorridor 601 extends from the Iranian port of Bandar Abbas via Tehran to the southwest coast of the Caspian Sea, meets the Azerbaijan railway south of Baku, and continues to Georgia's Black Sea ports or the BTK Railway. Subcorridor 604 connects this route to Pakistan and its ports of Karachi and Gwadar. Subcorridors 602 and 603 the North–South Corridor on the western and eastern sides of the Caspian Sea that could potentially serve traffic between the Russian Federation and Iran.

**Figure 1.5: Sections of CAREC Corridor 6 Relevant for Azerbaijan**



Source: CAREC Secretariat.

33. In the past decade, Iran and Azerbaijan completed the missing border sections of Subcorridor 601 but Iran has yet to build the missing link between Rasht and Astar, and the related gauge change facilities (para. 10).

34. ADY’s existing Corridor 6 traffic is small. This reflects the prevailing international sanctions against trade with Iran.

# TRENDS IN RAILWAY TRAFFIC

## A. Introduction

35. Historically, the rail link through Azerbaijan and Georgia and was developed to transport oil from Central Asia to Russia via the CTC and the Black Sea. Since Azerbaijan's independence, railway traffic has steadily declined. This is partly because many of its trading partners were part of the FSU and experienced a period of difficult economic adjustment. It also reflects heightened competition from oil pipelines, alternative regional transit corridors and road transport.

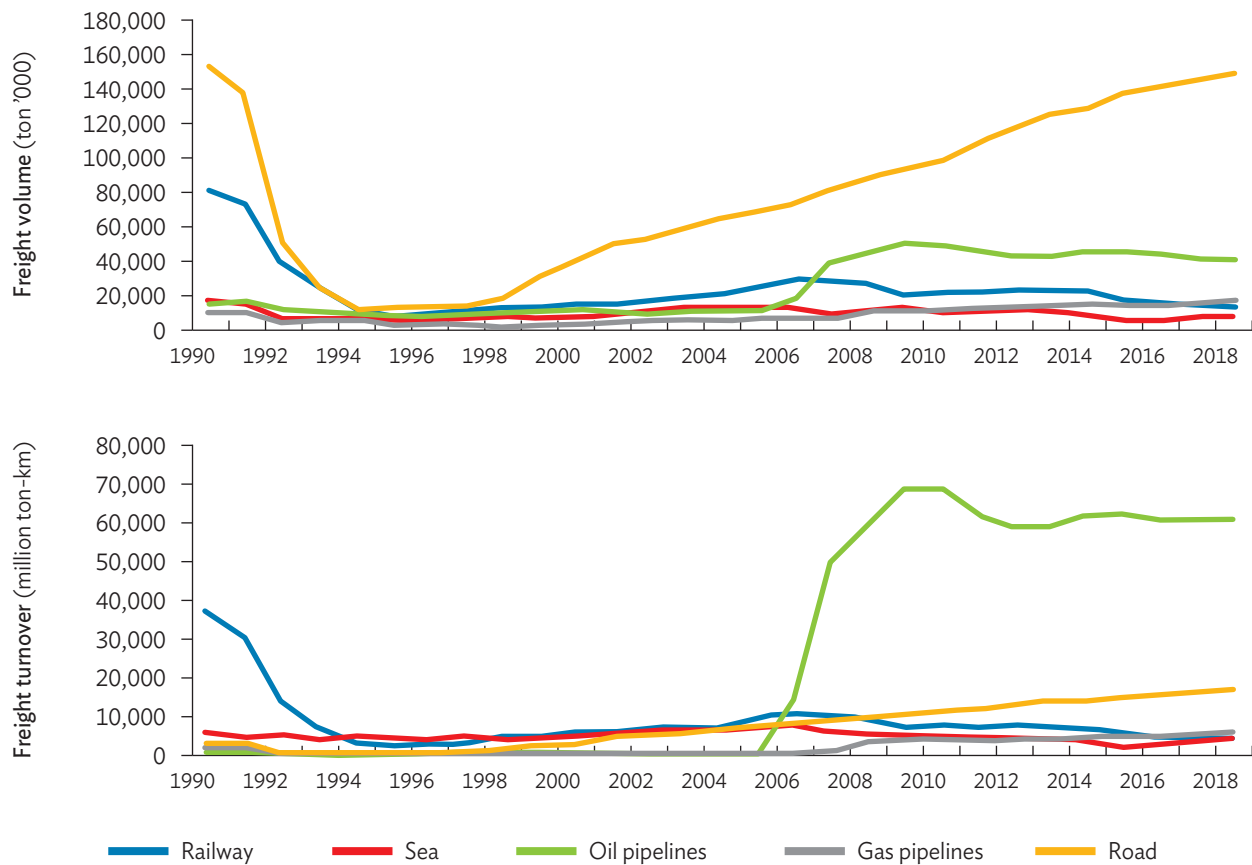
36. As efforts to expand regional economic cooperation and integration gather pace, trade flows between Asia and Europe have been increasing and countries have been addressing critical bottlenecks on regional transit routes. This is expected to lead to new and expanded traffic opportunities for ADY, including for transport of bulk commodities and containerized traffic.

## B. Freight traffic

37. As a result of the decline of the FSU's centrally planned economy, and the collapse of the FSU in 1991, all of Azerbaijan's main transport modes experienced a decline in freight volume and freight turnover between 1990 and the mid-1990s. After the mid-1990s, there was a gradual recovery in freight volumes and turnover of road transport, oil pipelines and gas pipelines, and by 2018 they had reached or surpassed 1990 levels. However, railway traffic volume and turnover did not recover to the same extent, and by 2018 were still less than 20% of 1990 levels in both volume and turnover terms. This is shown in Figure 2.1.

38. In the case of the two largest modes—road transport and railways—there was a severe decline in traffic volume after 1990. Road transport freight volumes declined from more than 153 million tons in 1990 to 12 million tons in 1994, and railway freight volume fell from 80 million tons in 1990 to 9 million tons in 1995. In the following years the freight volumes of most transport modes gradually recovered. Freight volume by road grew rapidly from 1995 onwards and reached 149 million tons in 2018. Since 1998 road transport volume has been increasing at an annual average of 11%, a trend that seems likely to continue in future. Freight volume by oil and gas pipelines recovered, especially after new pipelines came into operation after 2005. Oil pipeline volume rose from a low point of 9 million tons in 1996 to reach 45 million tons in 2018. After 1995, railway freight volume gradually increased to reach 30 million tons in 2006, but then declined steadily to only 14 million tons in 2018. Much of this decline was due to loss of traffic to pipelines. Freight volumes by Caspian Sea shipping also grew from grew from 1993 to 2005 but then declined, again partly due to loss of traffic to pipelines.

39. Trends in freight turnover reflect freight volumes and average transport distances. As Figure 2.1 shows, between 1990 and 2018 the most significant changes in freight turnover were the massive increase in oil pipeline turnover and the steady increase in road transport turnover. The introduction of new oil pipelines in 2005 led to a sharp increase in the average freight distance by oil pipeline, rising from 50–60 km in the early 1990s to more than 1,400 km in 2018. As a result, oil pipeline volumes in 2018 were almost 50 times the 1990 levels.

**Figure 2.1: Freight Volume and Turnover by Transport Mode, 1990–2018**

Note: Data excludes freight transport by non-transport entities.

Source: State Statistical Committee of the Republic of Azerbaijan 2019.

Road transport freight turnover grew through the combination of rapid growth in traffic volume after 1998 and a 5-times increase in average distance from 21 km in 1990 to 113 km in 2018. In the case of railways, the overall decline in freight volumes was exacerbated by a fall in the average trip distance from 462 km in 1990 to 322 km in 2018, so that railway freight volume in 2018 was only 12% of the 1990 level.

40. Table 2.1 summarizes the shares of the main transport modes in freight volume and turnover in selected years. This shows that in 1990 railway was

the dominant mode accounting for 75% of total freight turnover. However, in the face of competition from pipelines and road transport, the position of railway has steadily eroded since then. In 2018, oil pipelines and road transport accounted 83% of total freight turnover while the share of railway was only 5%.

41. The majority of ADY's railway freight volume consists of goods being transported to or from other countries. As Table 2.2 indicates, export and import traffic contributes about half of freight volume, transit traffic contributes just under a quarter, and domestic traffic is just over a quarter.

**Table 2.1: Modal Shares of Freight Turnover and Freight Volume in Selected Years**

| Transport Mode | Share of Freight Volume (%) |            |            |            | Share of Freight Turnover (%) |            |            |            |
|----------------|-----------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|
|                | 1990                        | 2000       | 2010       | 2018       | 1990                          | 2000       | 2010       | 2018       |
| Railway        | 29                          | 21         | 11         | 6          | 75                            | 34         | 8          | 5          |
| Shipping       | 6                           | 11         | 7          | 4          | 12                            | 32         | 6          | 5          |
| Air            | 0                           | 0          | 0          | 0          | 0                             | 1          | 0          | 1          |
| Oil pipelines  | 6                           | 16         | 27         | 19         | 3                             | 4          | 70         | 65         |
| Gas pipelines  | 4                           | 5          | 6          | 7          | 4                             | 9          | 5          | 6          |
| Road           | 55                          | 47         | 50         | 64         | 7                             | 20         | 11         | 18         |
|                | <b>100</b>                  | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b>                    | <b>100</b> | <b>100</b> | <b>100</b> |

Note: Data excludes freight transport by non-transport entities.

Source: State Statistical Committee of the Republic of Azerbaijan 2019.

**Table 2.2: Railway Freight Volume of Imports and Exports, Transit and Domestic Cargo, 2015–2018 (ton '000)**

| Indicator           | 2015     | 2016     | 2017     | 2018     |
|---------------------|----------|----------|----------|----------|
| Imports and exports | 9,168.9  | 7,576.1  | 7,156.0  | 7,054.0  |
| Transit traffic     | 3,926.0  | 3,786.8  | 3,345.7  | 3,044.0  |
| Domestic            | 3,994.6  | 4,116.8  | 4,056.5  | 3,856.0  |
| Total volume        | 17,089.5 | 15,479.7 | 14,558.2 | 13,954.0 |

Source: ADY 2019a.

42. As Table 2.3 indicates, the main commodities carried by ADY are coal, coke, petroleum products, and natural gas; minerals, metals ores and quarrying products; timber; agricultural products; and food products. Volumes of all the main railway freight commodities declined during 2014–2018.

43. In 2018, the value of Azerbaijan's imports of goods amounted to \$11.46 billion and its exports were \$19.46 billion. Its leading trade partners were the Russian Federation, Italy, Turkey, and the PRC. The main exports by value were mineral oil and petroleum products, and natural gas. The main imports by value were consumer goods (State Statistical Committee of the Republic of Azerbaijan 2019).

44. In spite of declining railway traffic, one positive trend has been growth in containerized rail freight. Between 2015 and 2017 the total number of containers increased from 10,638 to 14,242.

45. In future, it is expected that ADY's freight traffic will be influenced by the following: (i) shipment sizes are becoming smaller due to the trends toward individualization and use of ecommerce, (ii) customers are increasingly demanding door-to-door services, and (iii) containerization of freight will increase further. It will therefore be important for ADY to offer comprehensive logistics solutions in order to capture a larger share of consumer goods traffic. Tracking of cargo and estimation of arrival time are important requirements for many customers and will need to be introduced in future.

**Table 2.3: Leading Railway Freight Commodities, 2014–2018**

| Commodity   | Ton '000 |         | Change (%) |
|---|----------|---------|------------|
|   | 2014     | 2018    |            |
| Coal  | 6.6      | 340.5   | 5,059      |
| Coke  | 1.6      | 42.0    | 2,526      |
| Petroleum and petroleum products                    | 8,397.8  | 4,618.8 | -45        |
| Of which: crude petroleum                           | 1,635.2  | 161.2   | -90        |
| All kinds of ores                                   | 85.6     | 9.8     | -89        |
| Non-ferrous metal ores                              | 322.3    | 92.8    | -71        |
| Ferrous metal                                       | 1,261.6  | 981.4   | -22        |
| Products of wood                                    | 1,233.4  | 1,077.5 | -13        |
| Mineral construction materials (quarrying products) | 5,568.7  | 2,526.0 | -55        |
| Chemical and mineral fertilizers                    | 160.6    | 340.1   | 111        |
| Grain products                                      | 1,832.0  | 1,588.9 | -13        |
| Other   | 2,925.5  | 2,336.3 | -20        |

Source: State Statistical Committee of the Republic of Azerbaijan 2019.

## C. Passenger traffic

46. Since 1990, railway passenger numbers have dropped by 83%, with the railway share of total passenger transport falling from 11.5% to 1.4% in 2018. The distance travelled by rail declined to one quarter of the distance travelled in 1990.

47. During 2014–2018, total passenger trips by all modes increased steadily while railway passenger trips initially declined but then recovered. This is shown in Table 2.4. The average railway passenger travels a distance of 164 km. This is one third less than in 2014 but ten times the average travel distance in Azerbaijan.

**Table 2.4: Passenger Traffic by Railways and All Modes, 2014–2018**

|   | 2014    | 2015    | 2016    | 2017    | 2018    |
|---|---------|---------|---------|---------|---------|
| Number of trips – railway (million)         | 2.5     | 1.9     | 2.0     | 2.5     | 2.8     |
| Number of trips – all modes (million)       | 1,828.3 | 1,891.9 | 1,929.7 | 1,973.4 | 2,002.8 |
| Distance travelled – railway (million km)   | 612     | 495     | 448     | 467     | 468     |
| Distance travelled – all modes (million km) | 28,888  | 30,081  | 30,875  | 33,548  | 33,047  |
| Railway share of number of trips (%)        | 0.14    | 0.10    | 0.10    | 0.91    | 0.14    |
| Railway share of distance travelled (%)     | 2.12    | 1.65    | 1.45    | 1.39    | 1.41    |

Source: State Statistical Committee of the Republic of Azerbaijan 2019.

# MARKET COMPETITIVENESS

## A. Introduction

48. Azerbaijan's freight transport market is highly competitive. For long distance and heavy haul traffic there is competition from crude oil pipelines and alternative regional corridors. For shorter distance traffic, there is competition from road transport. There are few market entry barriers for road transport operators, with no regulation of tariffs, so there are many operators and competition is intense. In contrast, ADY is the sole railway operator and its tariffs are regulated.

## B. Market feedback

49. Railway is competitive for dry bulk cargo that is difficult to carry by truck, and for consignments that require a higher level of safety and security, including dangerous goods. For liquid bulk, in particular oil and gas, railway is generally not competitive compared with pipelines.

50. Railway is also competitive for containerized traffic. ADY Container, a subsidiary company of ADY, offers different services to support container transport. These include multi modal services, block trains, loading and unloading of cargo, creating shipping documents, and door-to-door services. ADY encourages container traffic by offering competitive tariffs, which are transparently calculated depending on the type and weight of the cargo, the transported distance and wagon usage (type of wagon, whether owned by carrier or privately).

51. The general market demand for railway container transport is growing. A rising number of containers are now being moved via the TITR, and Azerbaijan industries, such as the chemical industry (Sumgayit), are containerizing more of their production for onward distribution. The new port in Alat is also showing significant growth in container traffic, with container throughputs rising from about 22,887 TEU in 2018 to about 35,024 TEU in 2019.

52. The competitiveness of railway for other traffic types is limited by low service quality and reliability. Due to low reliability of trains, railway is not attractive for time-sensitive goods or perishables such as refrigerated cargo. Railway traffic could be significantly increased if reliability is improved, including by providing an estimated time of arrival, improving border crossing procedures, and introducing more efficient port and terminal operations. The ongoing upgrading of railway lines, and port and rail terminals, will be an important step in this direction.

53. Weaknesses in Caspian Sea shipping services are seen as a cost factor limiting the competitiveness of international railway services. The shipping lines claim that ferry services are unprofitable even though they charge high prices relative to railway tariffs. This is partly because much of their ferry fleet is aged and inefficient. Each ferry can only carry a maximum of 54 rail tank-cars or 80 TEU on wagons which is equivalent to approximately one block train.

54. The unreliable departure times and limited ferry capacity make the existing multimodal routes less popular than transport corridors that do not involve ferry transport. Rail ferries depart daily to



Turkmenistan and Kazakhstan but only leave when loading is completed rather than having a fixed time of departure. Fixing the departure time has been tried in the past but it was difficult to maintain the ferry schedules due to the fast changing Caspian Sea weather conditions. During the course of a year, there are days when the Caspian Sea is not navigable.<sup>16</sup> The limitation that ferries only have capacity to carry up to a maximum of one train per day is another problem for competitiveness but this should reduce in future as the ongoing fleet renewal program is expected to increase overall ferry capacity by 5 million tons by 2023.

55. The recent introduction of a container feeder ship offering services between Alat and Aktau and between Alat and Turkmenbashi is an important step toward more efficient Caspian Sea container services and has been welcomed by the market. However, ADY still believes that the use of rail ferries is an effective approach as it does not require any handling and only requires shunting of wagons. The long time-period these shipped wagons are made unavailable for other uses is not seen as disadvantage due to lack of cost monitoring. Another problem is that railway administrations sometimes use the wagons for other purposes before returning them to the country of origin.

**Table 3.1: Market Feedback on Rail Competitiveness for Different Traffic Types**

| Competitiveness       | Traffic Type   | Examples   | Explanation of Rail Competitiveness  |
|-----------------------|--|--|--|
| Rail is competitive   | Bulk transport   | Coal, oil products, metal ores, chemicals, construction materials                                    | Large scale bulk operations on rail are the traditional services and still provide the largest revenues to ADY   |
|                       | International container traffic                                | PRC–Europe, Central Asia–Europe  | Long-distance transport of containers is a growing market segment starting from a low level. Railways can have a competitive advantage over road transport if well connected to Caspian Sea shipping and to Georgia/BTK/Black Sea ports. |
|                       | Dangerous goods  | Poisonous, flammable corrosive cargo; fertilizers and chemicals using natural gas as feedstock       | Rail has advantages for safety and security which are prime considerations   |
| Rail is uncompetitive | Small to medium sized shipments requiring door-to-door service | Domestic supply of consumer goods, supply of consumer goods to and from nearby neighboring countries | Road is less costly, faster and simpler to organize and provides door-to-door service<br><br>Road is especially price competitive for shorter trips (e.g., 100–300 km) and for origins and destinations not on railway line              |
|                       | Perishables  | Imports of refrigerated containers from Black Sea ports  | Rail is not reliable to guarantee a 48 hour delivery between ports and Baku region which would be the minimum requirement for perishables  |

ADY = Azerbaijan Railways, BTK = Baku–Tbilisi–Kars, km = kilometer, PRC = People’s Republic of China.

Source: TA consultants.

<sup>16</sup> It is navigable for more than 300 days each year.

## C. Problems affecting rail competitiveness

56. Compared to road transport, which is dynamic and highly competitive, ADY's railway services are not flexible enough, and railway tariffs are still based on the old FSU system that does not relate tariff levels to present costs and market requirements.

57. ADY is gradually addressing weaknesses in its infrastructure and train operations. It has been investing in track renewal and re-electrification that should lead to significant improvements in service reliability in future.

58. Wagon availability and quality are recurring problems. Much of ADY's wagon fleet is old, many wagons are defective, and the mix of wagon types does not match market needs. ADY is now taking steps to address these problems, notably by acquiring more than 3,000 new wagons in the last few years.

59. Wagon availability is further influenced by the necessity of ferry transport and the long waiting times of trains at the ports. This limits the productive time of the wagons. The problem could be overcome by further promoting container transport on container vessels across the Caspian Sea or by requiring goods to be transhipped upon arrival from the ferries so that the wagons can be returned to their owners. That way, more wagons would be available for productive use.

60. One major limitation of ADY's rail freight department is lack of commercial information. Without basic information about costs of services and assets, there is not a reliable basis for changing tariffs and commercialization of ADY's products and services.

61. ADY needs to develop its ongoing base of information on market conditions and requirements so that it can become a critical input in tariff setting with a view to attracting additional traffic and optimizing the profitability of ADY's main services. This will require continuous monitoring (e.g., market conditions, transported commodities, type of transport, type of wagons).

# RAILWAY OPERATING AND FINANCIAL PERFORMANCE

## A. Introduction

62. This chapter briefly examines ADY's commercial orientation and its operating and financial performance.

## B. Commercial orientation

63. The government wishes ADY to become financially viable without subventions from the state budget. This will require it to attract additional traffic, improve operating efficiency and reduce operating costs, and ensure that tariffs are set at levels capable of attracting traffic and optimizing the profitability of its main services.

64. With support from ADB, ADY is implementing a sector development program of institutional reforms and infrastructure investments, based on an agreed reform program (ADB 2017b). The program's main reform and commercialization activities focus on (i) enhancing governance, and management and financial autonomy, (ii) implementing a three-phase plan to restructure ADY's debt liabilities, (iii) improving financial and management control and reporting, and (iv) enhancing operational efficiency and effective corporate restructuring. In the second phase of corporate restructuring, it is planned to separate off the repair and maintenance activities in wagon and locomotive services depots to ensure operational efficiency and proper asset management of rolling stock, and minimize downtime. It is also planned to reorganize the cargo and sorting operations within the stations.

65. In 2019, as part of efforts to attract more traffic and improve commercial performance, ADY established a marketing team that reports directly to the board. This is expected to elevate the role of information about market conditions and opportunities, and improve ADY's communication with existing and potential customers so they are better informed about ADY's services and ADY is better positioned to adjust services in line with market requirements.

66. As railway operational efficiency is low (e.g., wagon utilization), the costs of running trains are estimated to often be higher than the revenues they earn. Alongside improving operational efficiency, reliability and service quality, ADY needs to establish a reliable system for calculation of train costs to guide efforts to become competitive in different market segments and ensure that services operated are profitable.

67. The current accounting system does not separately report on the costs and revenues of ADY's main lines of business which makes it difficult for ADY management to make informed decisions about how to reorient its lines of business to increase traffic and improve profitability. Currently, ADY is using the 1C accounting system from the Russian Federation as an interim measure while its Activity Based Costing System is being prepared. Draft rules on a service level agreement (SLA) covering the definition of liability for additional costs, dispute resolution rules, and other related issues have been developed, and it is expected these will be approved in the near future. The SLA envisages interaction between structural units and divisions of ADY, including coordination of their activities and determination of duties.

68. Since 2017/2018, ADY has also been implementing “ADY Smart”, a freight monitoring software. This is being used to monitor wagon utilization on the network and will also monitor freight locomotive utilization in future. This information will help in formulating actions to improve wagon and locomotive utilization performance. It also monitors all scheduled maintenance work for the wagons.

69. In 2019, ADY also purchased a train timetabling software. Once data has been fully integrated, the software will monitor the performance of all trains, including freight trains, which are run without timetable today. This will provide management with information on key indicators, such as train delays. It will also simulate timetable scenarios and timetable adjustment options to better coordinate freight and passenger trains within the available infrastructure capacity, not only for operations but also for maintenance purposes, and help ADY to identify the associated impact of different scenarios on traffic turnover and revenues.

70. Further challenges to be expected in the coming years will be to bring about an expansion of intermodal services and to strengthen human

resources. ADY needs to replace its aging operations staff and attract skilled young workers and graduates. The total labor force is to be reduced from 21,000 in 2017 to 16,000 in 2020. For projects like the Sumgayit–Yalama railway, ADY is making more use of international experts on contract. So far, staff reduction has been accomplished mainly by non-replacement of retired workers.

## C. Financial performance

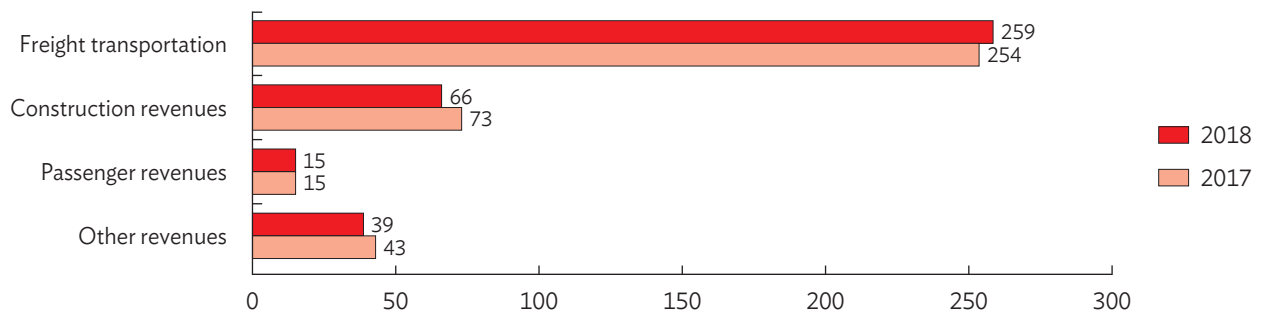
71. ADY produces annual financial statements in accordance with International Financial Reporting Standards. As reported in its audited financial statements, ADY has been making losses for some years (Table 4.1). During 2014–2018, its operating ratio remained above 1.0, indicating that operating revenues are insufficient to cover operating expenses and therefore need to be supplemented with funds from other sources such as borrowing or injections of additional equity by the government.<sup>17</sup> In comparison, North American class 1 railways, which steadily improved their financial performances over the past two decades, generally have operating ratios less than 0.7.

**Table 4.1: Highlights from ADY Financial Statements, 2017/2018 (AZN ‘000)**

|                            | 2014      | 2015      | 2016      | 2017      | 2018      |
|----------------------------|-----------|-----------|-----------|-----------|-----------|
| Revenues                   | 271,901   | 276,629   | 363,034   | 384,648   | 378,197   |
| Operating expenses         | (305,238) | (338,133) | (370,430) | (427,596) | (488,964) |
| Other income/expenses      | (25,637)  | (802,993) | (558,240) | (510,286) | (259,271) |
| Profit/(loss) before taxes | (58,974)  | (864,497) | (565,636) | (553,234) | (370,038) |
| Tax expenses               | (10,098)  | (171,129) | (68,950)  | (2,309)   | (1,593)   |
| Net profit/(loss)          | (48,876)  | (693,368) | (496,686) | (555,543) | (371,631) |
| Operating ratio            | -1.12     | -1.22     | -1.02     | -1.11     | -1.29     |
| Debt/equity ratio          | 0.37      | 1.32      | 2.31      | 3.39      | 2.50      |

Source: ADY Annual Reports.

<sup>17</sup> The operating ratio is defined as operating expense divided by operating revenue.

**Figure 4.1: Revenues by Source, 2018 (AZN million)**

ANZ = Azerbaijan manat.

Source: ADY 2019b.

72. As shown in Figure 4.1, freight services provide the majority of ADY revenues, while passenger services only make a small contribution to revenues. In 2018, 68% of revenue was from freight, 17% from construction revenues, 4% from passenger services and 10% from other revenue sources. The construction revenues were mostly from construction work carried out in Georgia. Passenger revenues remain low in spite of higher passenger numbers following introduction of new trains to serve local traffic in the Baku area since 2016/2017. The newly-operating fast train to Ganja, and the Peninsula Circle Line, will further increase passenger numbers. However, these services are not assumed to be profitable. The present average ticket price of less than AZN1.0 (\$0.59) for the local service will not even cover operating costs. Yet, if AZN raises prices it will not be competitive with buses and taxis.

73. ADY's operational expenses have been steadily increasing, rising from AZN305 million in 2014 to AZN489 million in 2018. This has included increases in spending on maintenance. However, analysis shows that the financial contribution to maintenance of both rolling stock assets and infrastructure maintenance has been insufficient compared with needs. This helps to explain why asset condition has deteriorated.

ADY's newly purchased infrastructure and rolling stock will need higher annual spending on maintenance if they are to retain their value and make their potential contribution to business performance.

74. There is ongoing dialogue between ADY, the Ministry of Economy and the Ministry of Finance on establishing a long-term funding arrangement for infrastructure maintenance, either through a service provision agreement or a multi-annual contract. This would cover the gap between infrastructure operation and maintenance funding needs and what can be funded from user-fees.

75. To bring ADY onto a financially sustainable basis, it also needs to receive a state contribution to cover losses on unprofitable passenger services that the government wishes it to operate. Otherwise, passenger service losses will continue to be funded by cross-subsidies from the freight business which undermines its long term sustainability. The proposal under discussion is to establish a long term PSO contract to finance losses from commuter services and domestic intercity passenger services.

76. Discussions are also ongoing about the costs and profitability of each of ADY's main types of service to determine future funding requirements.

However, reliable estimation is currently not possible due to the inability of ADY's existing accounting system to separately identify the costs, revenues and profitability of each of the main lines of business.

77. ADY has a relatively high debt-to-equity ratio which increased significantly in recent years (Table 4.1). During 2017–2020, a total of \$738 million of debt was restructured through negotiations with lenders. Some of the obligations to lenders were closed, and the payment schedules for the remaining debt were revised. Part of the funds for refinancing debt was provided by the government (\$413 million). The remainder was provided through loans from ADB (\$250 million) and the French Development Agency (\$75 million). As a result of the debt restructuring, the average interest rate for all ADY debt decreased from 4.4% to 1.2% compared to 2016, and the repayment period increased from 6.4 to 9.4 years.

## D. Operational benchmarking

78. Drawing upon railway operational data obtained from the International Union of Railways (UIC),<sup>18</sup> aspects of the operational performance of ADY have been benchmarked in relation to other CAREC railways (except Afghanistan)<sup>19</sup> and leading railways from other regions (Germany, India, the Russian Federation, and North America).<sup>20</sup> In most cases the data refers to operational activities in 2017. In other cases, it refers to the most recent year for which data is available.

79. In terms of size of railway network and number of employees, ADY is the one of the smaller railways in the CAREC region, and small compared with leading railways in other regions. This is shown in Figure 4.2.

80. The number of wagons owned by ADY is broadly comparable to those in other CAREC MCs except for the PRC, Kazakhstan, and Uzbekistan. ADY has acquired a significant number of new freight wagons in the recent past, while taking older wagons out of service. Its fleet of diesel locomotives is also broadly comparable with other smaller CAREC railways. Since 57% of lines are electrified, many of the diesel locomotives are used for shunting purposes. This is shown in Figure 4.3.

81. ADY's annual freight and passenger turnover is relatively small compared with most of the other CAREC MCs. This is shown in Figure 4.4. This is caused by the very small modal share of railways within Azerbaijan's transport market in general and also reflects limitations in ADY's commercial practices to optimize revenues.

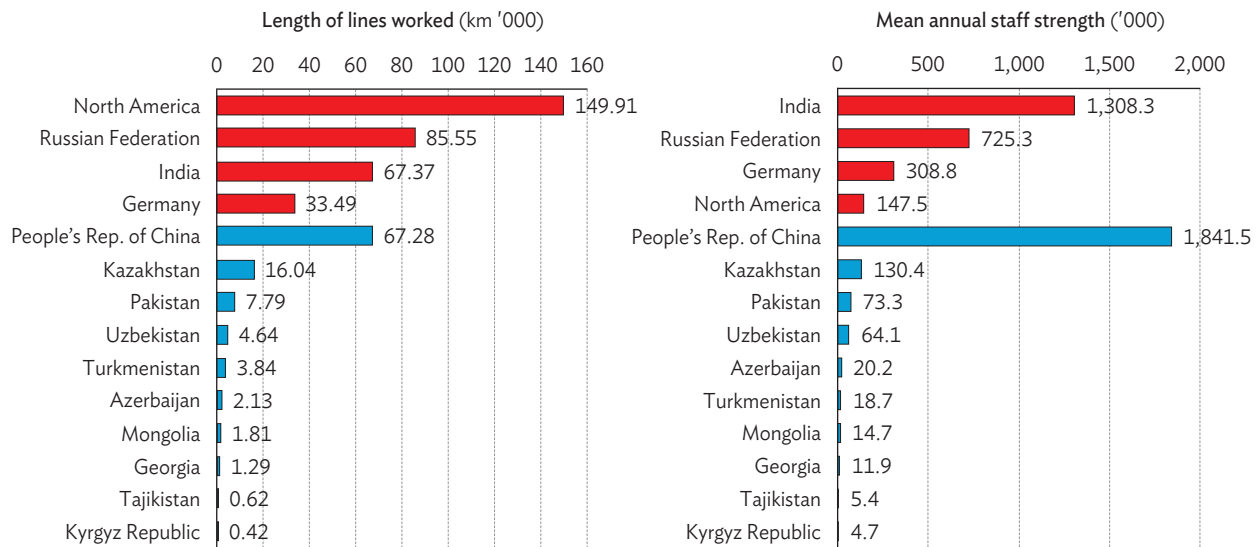
82. Track density measures the intensity of track utilization in terms of traffic volume per km of rail. ADY's track density is the second lowest among the comparator countries. This confirms that ADY's current infrastructure utilization is very low and needs to be enhanced. Similarly, staff productivity can be measured as the volume of traffic per staff member. ADY's staff productivity is again one of the lowest among the comparator countries. This provides a further indication that ADY is overstaffed for its present level of operations. This is shown in Figure 4.5.

<sup>18</sup> The UIC database consists of data self-reported by individual railway organizations.

<sup>19</sup> The UIC database does not yet include data for Afghanistan so it is not included in the benchmarking analysis.

<sup>20</sup> In addition to the national railways of CAREC countries, the sample includes Indian Railways (India), Deutsche Bahn AG (Germany), Russian Railways, and the Association of American Railroads (North America) which represents the major freight railways of Canada, Mexico, and the United States.

**Figure 4.2: Comparison of Railway Length and Staff Size in Azerbaijan, other CAREC Member Countries and other Leading Railway Countries**

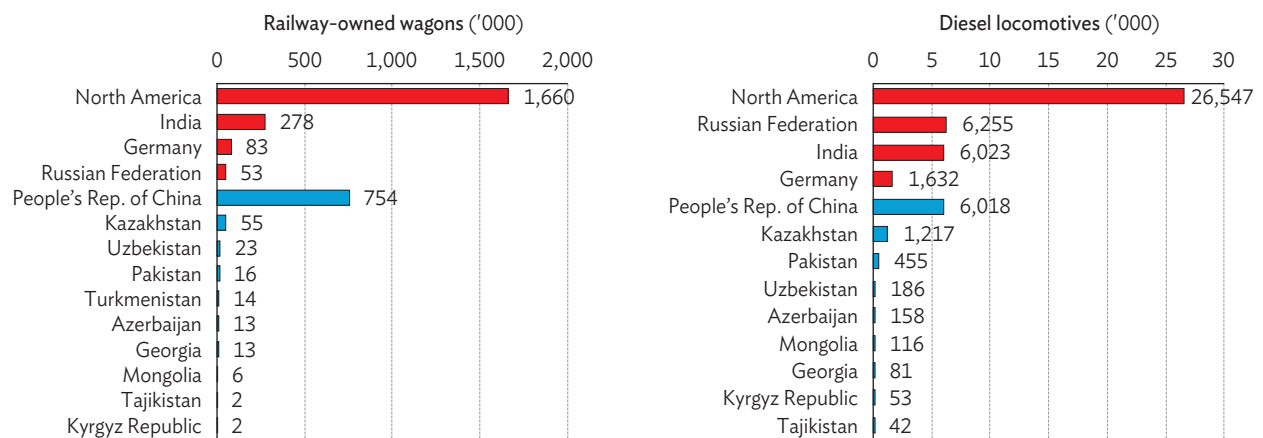


CAREC = Central Asia Regional Economic Cooperation, km = kilometer.

Note: CAREC Member Countries shown in blue, comparators from other regions shown in red.

Source: UIC 2019.

**Figure 4.3: Comparison of Railway Rolling Stock Fleet in Azerbaijan, other CAREC Member Countries and other Leading Railway Countries**

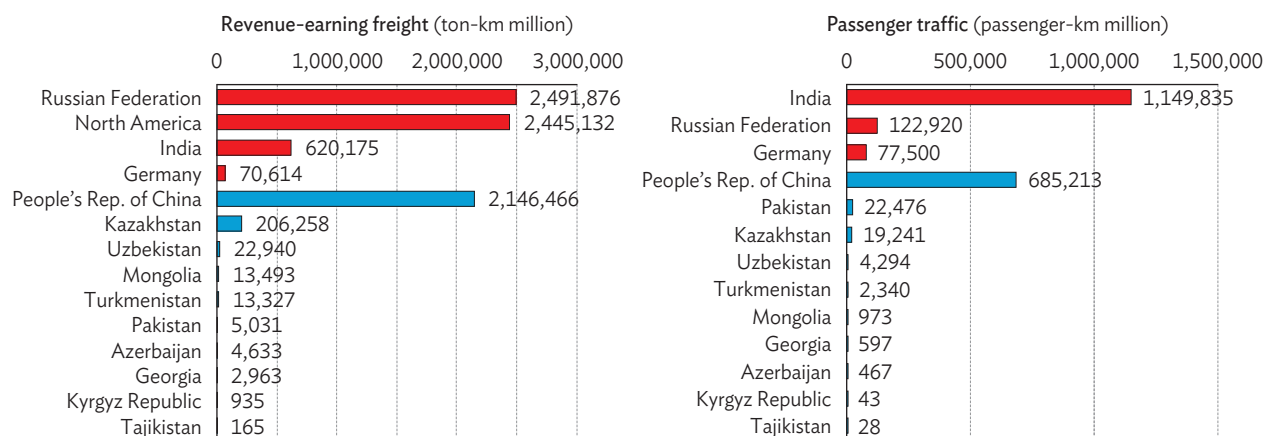


CAREC = Central Asia Regional Economic Cooperation.

Note: CAREC Member Countries shown in blue, comparators from other regions shown in red.

Source: UIC 2019.

**Figure 4.4: Comparison of Annual Railway Freight and Passenger Traffic Levels in Azerbaijan, other CAREC Member Countries and other Leading Railway Countries**

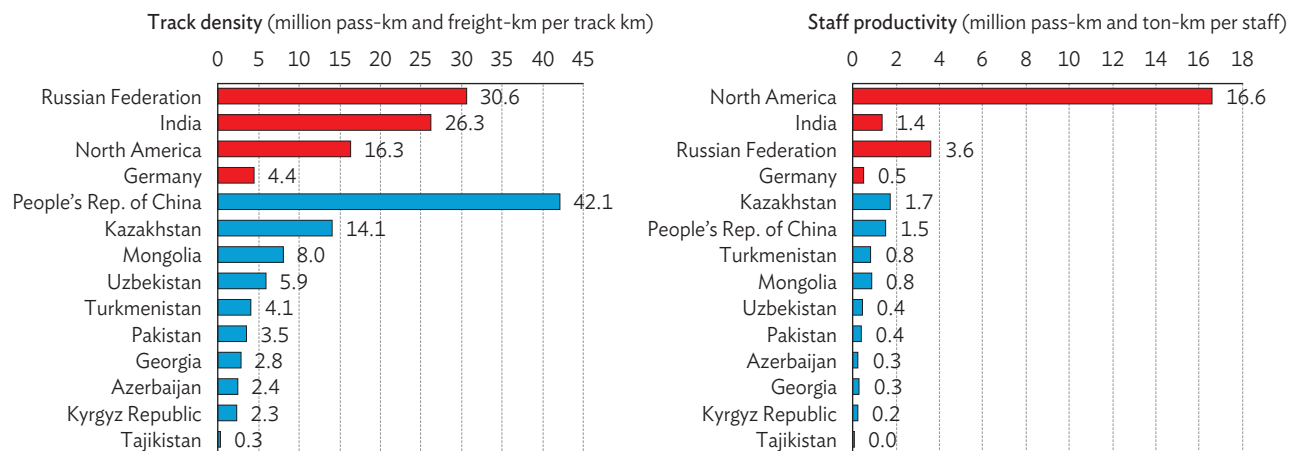


CAREC = Central Asia Regional Economic Cooperation, km = kilometer.

Note: CAREC Member Countries shown in blue, comparators from other regions shown in red.

Source: UIC 2019.

**Figure 4.5: Comparison of Railway Track and Staff Productivity in Azerbaijan, other CAREC Member Countries and other Leading Railway Countries**



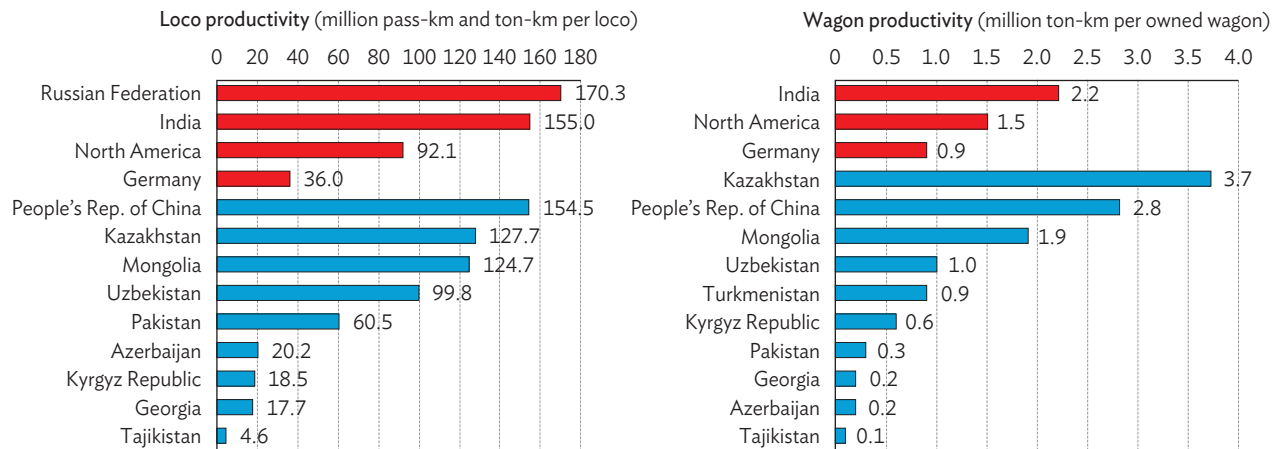
CAREC = Central Asia Regional Economic Cooperation, km = kilometer.

Note: CAREC Member Countries shown in blue, comparators from other regions shown in red.

Source: UIC 2019.



**Figure 4.6: Comparison of Locomotive and Wagon Productivity in Azerbaijan, other CAREC Member Countries and other Leading Railway Countries**



CAREC = Central Asia Regional Economic Cooperation, km = kilometer.

Notes: (i) CAREC Member Countries shown in blue, comparators from other regions shown in red; (ii) productivity calculations are less accurate for countries with higher use of leased locomotives or wagons, such as Kazakhstan.

Source: UIC 2019.

83. As shown in Figure 4.6, a further set of productivity measures concerns rolling stock asset utilization. Locomotive productivity measures annual traffic volume per locomotive. ADY's locomotive productivity is one of the lower among the CAREC MCs. Wagon productivity measures annual traffic volume per owned wagon.

ADY's wagon productivity is again the second lowest among the CAREC MCs. For both locomotive and wagon productivity, the common underlying issue is low traffic volume. In order to address this problem, ADY requires not only asset modernization but also institutional improvements and commercialization.

# PROPOSALS FOR INVESTMENT, COMMERCIALIZATION, AND REFORM

## A. Introduction

84. Drawing upon the previous chapters, this final chapter discusses opportunities for railway sector development in Azerbaijan and identifies promising proposals to be considered for prefeasibility study support, capacity development and knowledge-related assistance through the present CAREC Railway Sector Development TA.

## B. Policy setting

85. The government and ADY have been implementing the reform actions defined in the agreed reform program for the ADB loan (para. 21). In the process, the government has demonstrated its commitment to improve the performance of railways over the longer term.

86. Currently there is no railway law in Azerbaijan. A draft Law on Railway Transport following incorporating international best practices as been submitted to the government and is under consideration. The adoption of a railway law will play an important role in guiding railway development and clarifying the roles and responsibilities of participants, including the private sector.

## C. Commercialization and reform

87. Commercialization remains an important area for improvement within ADY. The internal reforms of the company need to lead to ADY being able to offer a more competitive service offering to customers.

88. ADY has set five main strategic goals for commercialization and reform. These are to (i) improve service reliability, leading to higher customer satisfaction; (ii) increase efficiency, leading to lower unit costs; (iii) improve financial sustainability, leading to a lower operating ratio; (iv) strengthen market orientation, leading to a higher market share; and (v) further improve safety, resulting in fewer accidents. In order to achieve these goals, ADY's corporate strategy, based on these strategic goals, is currently under development by an international consulting firm.

89. To offer customer-oriented products, a marketing team was recently established. This team will need to work in close coordination with ADY's operations functions. The team has commenced an in-depth market analysis to gain detailed insight into customer segments. Several initiatives are underway to improve customer experience across passenger and freight services. These initiatives will also enable better understanding of customer needs, focused product development and competitive positioning.

90. ADY's Business Plan, drafted by KPMG and approved by the Cabinet of Ministers in 2017, contains broad information on strategic actions and plans for the next 5 years. The majority of reforms intended in the Business Plan have been implemented successfully. It is intended to update ADY's Business Plan in future.

91. Key performance indicators (KPIs) for ADY have been defined and interim steps identified to determine progress toward achieving the KPIs. However, ADY's organizational structure still needs reforms and its management needs more transparent information from the operations and finance functions for purposes of evaluating ADY's commercial situation.

92. An important reform issue that has yet to be addressed is the establishing of long term sector financing mechanisms. These should include (i) a SLA or multi-annual contract to finance the gap in maintenance financing, and (ii) a PSO to compensate for losses on passenger services. For such mechanisms to be workable, ADY needs to establish the necessary capacity to monitor operational and financial performance and report this regularly to the government. Another important reform issue is the need to change the tariff system which is inflexible and does not reflect the costs of operations.

## D. Proposals for support from CAREC Railway Sector Development

### 1. Prefeasibility studies

93. **Facilities for rolling stock maintenance.** Modernization of ADY's rolling stock fleet is ongoing, including procurement of EMUs, freight wagons and locomotives. ADY has already been carrying out the periodic maintenance of the new

EMUs and passenger wagons (monthly, quarterly, semi-annually and annually). Conceptual designs have been prepared for the construction of new depots for execution of the capital repair of the EMUs and passenger wagons. The construction of new depots for Alstom locomotives in Baku and Ganja began in 2018 and is expected to be completed in 2021. A contract has also been signed for on-the-job-training of the technical staff of ADY in the execution of routine preventive maintenance. Consulting services for the development of an operational plan for maintenance of rolling stock are planned to start in 2021.

### 2. Knowledge products and events

94. **Improving the competitiveness of the TITR.** Azerbaijan, Georgia, Kazakhstan, and other members of the TITR have made progress improving infrastructure and equipment for railways and ports. However, for shippers and freight forwarders, the overall competitiveness of the TITR depends on the quality and efficiency of the entire corridor from origin to destination. This requires coordination of multiple countries and agencies along the corridor to integrate their actions and harmonize service quality. Lessons from other regions suggest that coordination and harmonization can be improved by establishing a corridor management organization (CMO) or corridor management system. This can take responsibility for organizing more regular block trains; setting stable rates for through transportation from origin to destination; designing improvements in service quality, reliability and speed; promoting the corridor to users; monitoring corridor performance and competitiveness; and identifying and resolving performance issues. The proposed study would examine the performance and competitiveness of the TCIP compared with the requirements of customers, document best practices in rail corridor management, and identify actions needed to improve performance and competitiveness. These might include identifying how to introduce a CMO, establishing an effective marketing and sales

function (e.g., a regional container logistics company/ freight forwarder with agreed through-tariffs), adopting of common electronic documentation, and setting up a regional wagon supply company jointly owned by members of the TITR Association. Depending on interest within the TITR, advisory support could be provided to define level and quality of service targets for the TITR (especially to reduce transit time), prepare a draft agreement on introducing a CMO and other measures to improve TITR competitiveness, and provide technical support for dialogue on adopting the agreement.

**95. Use of KPIs to drive railway commercialization and reform.** As ADY's reform program indicates, KPIs play a vital role in providing direction for railway reform programs. These need to be selected on the basis of both strategic relevance and availability of data for tracking performance. The proposed knowledge product would conduct workshops with relevant ministry and ADY staff on defining strategically relevant KPIs, assessing data availability, and using KPIs to track reform progress and as a decision-making tool for management.

**96. Container block-train operational practices.** Increased containerization of freight would improve the prospects for long-distance container block trains. The new BTK line and the recent improvements in container shipping and port handling on the Caspian and Black Seas have improved the basis for container rail services. However, railway staff also need training on the main aspects of organizing and operating container block trains to meet customer service quality requirements, and the role of management information and decision making to bring about service quality improvements. The proposed knowledge product would prepare a paper summarizing good practices in organizing, operating and managing container block train services, and conduct short training workshops for railway staff.

**97. CAREC rail containerization study.** Increased containerization of freight would improve the competitiveness of long-distance railway traffic, including by simplifying gauge changes and intermodal transfers, providing improved security and traceability, and enabling use of container block trains. However, containerization rates in Central Asia remain low, especially east of the Caspian Sea where container turnaround times are high and lower demand in the westbound direction leads to large numbers of empty containers. In recent years trade has been growing rapidly in Central Asia. Some international container shipping companies are now allowing their containers to be used more widely in Central Asia in the expectation that the coming decade will see rapid growth in containerization. The proposed study would be conducted on behalf of CAREC members of the TITR Association to examine the causes of existing low container penetration, identify opportunities for increasing containerization (e.g., types of goods), and prepare a containerization strategy to be pursued in collaboration with shipping lines, drawing upon international best practices (e.g., on promoting containerized services to customers, container terminal planning, container tracking methods, positioning systems for containers and wagon platforms, and refrigerated container management). The study would be used to initiate a joint dialogue between CAREC TITR railways and several international container shipping companies.

**98. Logistics center and intermodal terminals.** Ensuring efficient intermodal transfers is crucial for the success of container trains and for the consolidation of container volumes from different industries and corridors. ADY Container is interested to see container train services expand in future and is currently building a second modern multimodal facility at Sumgayit. Taking into account forecast container volumes, the proposed knowledge product would prepare a high-level study to identify intermodal terminal needs over the medium term.

## E. Main opportunities for support under CAREC Railway Sector Development TA

99. Based on the preceding chapters, the more promising opportunities for possible support under the present TA are summarized in Table 5.1.

**Table 5.1: More Promising Azerbaijan Opportunities for Possible Support Under CAREC Railway Sector Development TA**

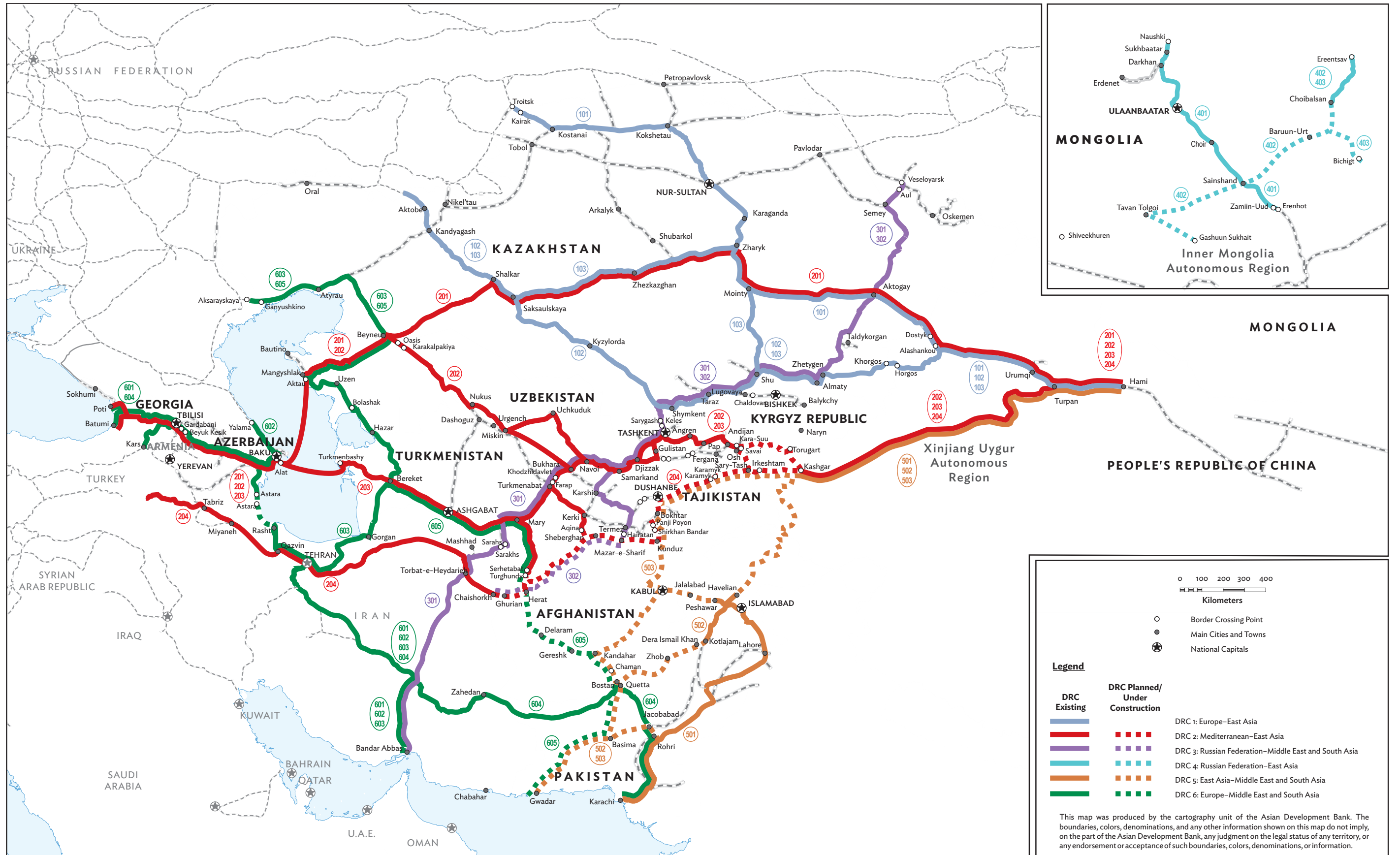
| Type of Support               | Subject   |
|-------------------------------|---|
| Prefeasibility study          | Facilities for rolling stock maintenance                                |
| Knowledge products and events | Study and advisory support on improving the competitiveness of the TITR |
|                               | Workshop/s on use of KPIs to drive railway commercialization and reform |
|                               | Paper and workshop on container block-train operational practices       |
|                               | CAREC rail containerization study                                       |
|                               | Study of logistics centers and intermodal terminals                     |

CAREC = Central Asia Regional Economic Cooperation, KPI = key performance indicator, TA = technical assistance, TITR = Trans-Caspian International Transport Route.

Note: Selection of prefeasibility studies, capacity development support and knowledge products and events is based on established submission templates and selection criteria, and overseen by the Railway Working Group.

Source: TA consultants.

# APPENDIX | CAREC DESIGNATED RAIL CORRIDORS



DRC = designated rail corridors.  
Source: CAREC Secretariat.

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## **Railway Sector Assessment for Azerbaijan**

The report summarizes the findings of the railway sector assessment for Azerbaijan, based on a country visit conducted in 2018 and 2019. The purpose of this assessment is to examine the setting, characteristics, performance and prospects of railways, and identify promising investment opportunities, commercialization and reform actions that could be considered for support through the ADB technical assistance for Railway Sector Development in CAREC countries.

## **About the Central Asia Regional Economic Cooperation Program**

The Central Asia Regional Economic Cooperation (CAREC) Program is a partnership of 11 member countries and development partners working together to promote development through cooperation, leading to accelerated economic growth and poverty reduction. It is guided by the overarching vision of “Good Neighbors, Good Partners, and Good Prospects.” CAREC countries include: Afghanistan, Azerbaijan, the People’s Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.